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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

F. Lenhard, et al.

Serial No.: 10/030,009

Filed: February 15, 2002

For: CURRENT SENSOR WORKING
IN ACCORDANCE WITH THE
COMPENSATION PRINCIPLE

Group Art Unit: 2829

Examiner: E. Karlsen

July 29, 2003

Attorney Docket No. 47192/265185

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Dan W. Runyon
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AMENDMENT, RESPONSE, AND
PETITION FOR EXTENSION OF TIME

Dear Sir:

This paper is submitted in response to the Office Action mailed
February 19, 2003 in connection with the above-identified application. A marked-up
version of amended claim 1 appears behind Tab A.

Amendment

Kindly amend claim 1 to read as follows:

1. (twice amended) A current sensor having an output and comprising:
a primary winding through which the current to be measured
flows, creating a magnetic field,

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a secondary winding, through which compensation current flows, which generates a magnetic field compensating the primary winding, whereby the primary winding and the secondary winding combined form a converter with a certain resonance frequency,

a terminating resistor connected in series to the secondary winding,

sensor means, which are exposed to the resulting magnetic field of the primary and secondary windings,

a booster circuit, which is closer to the output than the sensor means, and which feeds the compensation current to the secondary winding via the terminating resistor, whereby the compensation current is pulse-duration modulated with a timing frequency above the resonance frequency of the converter, and

a low-pass filter arrangement for stabilizing the pulse-duration modulated compensation current, which is closer to the output than the booster circuit, comprising inductances and capacitances, which possesses a filter frequency threshold below the resonance frequency of the converter and below the timing frequency of the booster circuit, as well as excessive resonance, whereby the excessive resonance of the low-pass filter arrangement is damped by an RC element connected in parallel to the secondary winding and the terminating resistor.

Response

A. Introduction

Claims 1-5 remain pending in the application. The Examiner initially rejected these claims under 35 U.S.C. § 112 as including several statements he considers unclear. The claims also were initially rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 6,177,791 to Lenhard in view of either U.S. Patent No. 3,815,012 to Milkovic or U.S. Patent No. 5,150,270 to Ernst, et al.

B. Section 112 Rejection

The Examiner initially rejected claims 1-5, contending:

It is not clear what is meant by "compensation principle." It is not clear what is meant by "down-streamed" anywhere it appears in the claims.

See Office Action at p. 2. The Examiner also indicated uncertainty about "where a signal is generated that is representative of the current sensed by the current sensor" and commented further that "[t]he claims should not be included in the specification."

Id. However, because the Examiner neither objected to the specification nor identified where therein the claims are included or the queried signal is referenced, Applicants do not believe any amendment to the specification is necessary.

Likewise, Applicants do not believe the claims as originally drafted are unclear. However, to resolve the Examiner's concerns, Applicants have deleted from claim 1 the phrase "according to the compensation principle" and references to "down-streamed." These amendments, while not narrowing the scope of the claim in any way, nevertheless should satisfy the Examiner, and Applicants accordingly request that the section 112 rejection be withdrawn.

C. Section 103(a) Rejection

The Examiner also initially rejected claims 1-5 as obvious in view of the disclosure of the Lenhard patent combined with that of either the Milkovic patent or the Ernst patent. According to the Examiner, the Lenhard patent "shows the basic system claimed except for an RC element connected across a secondary winding and terminating resistor to change frequency characteristics." See id. at p. 3. Applicants disagree.

Contrary to the Examiner's contention, the Lenhard patent does *not* disclose a booster circuit providing compensation current that is pulse-duration modulated. (Indeed, the Examiner has not identified any such disclosure in the Lenhard patent, merely describing the patent as showing "the basic system" recited in the claims.) This aspect of claim 1 similarly is neither taught nor suggested by the Milkovic and Ernst patents. Hence, for at least this reason, claims 1-5 should be allowed.

Further, although Figure 2 of each of the Milkovic and Ernst patents illustrates series-connected resistors and capacitors arguably connected in parallel across windings, Applicant believes these elements function as low-pass filters rather than excessive resonance dampers. The inputs of these filters, further, are connected to sensing coils rather than to a secondary winding through which compensation current flows. Consequently, whereas the present invention deals with the output signals of the current sensor, the circuitries of the Milkovic and Ernst patents deal with the input signals. Thus, even assuming (but not conceding) that one skilled in the relevant art would know to combine the resistors and capacitors of the Milkovic

and Ernst patents with the circuits of the Lenhard patent, such elements would merely constitute alternatives for the low-pass filter recited earlier in claim 1. Applicants thus believe claims 1-5 should be allowable for this reason as well.*

Petition for Extension of Time

Pursuant to 37 C.F.R. § 1.136(a), Applicants petition the Commissioner for all extensions of time needed to respond to the Office Action.

Fees

Enclosed is a check for \$930.00 for the petition fee. Applicants believe no other fee presently is due. However, if Applicants' belief is mistaken, the Commissioner is authorized to debit Deposit Account No. 11-0855 for any additional fee due as a consequence of Applicants' submission of this paper.

*Additionally, a simple RC element, as recited in claim 1, is a two-pole network, in contrast to the four-pole network of an RC filter. Such an RC element is, basically, a frequency-dependent impedance while an RC filter is a filter circuit that damps signals according to their respective frequencies. Two-pole networks are, generally, like single elements (e.g. resistors, capacitors), whereas four-pole networks are like circuitries having an input and an output. As is well known, two-pole networks have different behaviors than four-pole networks. In the present invention, the RC element serves as a frequency-dependent terminating resistor, while the Milkovic and Ernst patents use filters in order to discriminate signals with certain frequencies (with Milkovic, in particular, using active filters).

Conclusion

Applicants request that the Examiner allow claims 1-5 and that a patent containing these claims issue in due course.

Respectfully submitted,



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